

**ABSTRACT OF THE DISCLOSURE**

The present invention includes an article of manufacture with a layer with a plurality of corrugations to form an energy absorbing structure, where each corrugation has a floor and two walls connecting the floor to the base layer and the length of each corrugation is longer than the widest width of the corrugation. The present invention also includes an energy absorbing structure with a multi-layer energy absorber having a layer with a plurality of surface features and a second layer with a second plurality of surface features wherein the surface features of one layer are nested within the surface features of the other layer such that the base layers are adjacent to each other. The present invention also includes a single step method of manufacturing the energy absorbers including forming a two layer material in a single step. Further, the present invention includes a method of absorbing impact energy that involves generating heat through friction between surface features on a pair of base layers.